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Panel Discussion

“The Role of Forest Products in Solving the Nation’s Energy and Climate Changes”

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Today I will be presenting the perspectives of both Catchlight Energy and Weyerhaeuser Company. As one of the world’s largest forest products companies, Weyerhaeuser grows and manages an abundant, renewable resource – biomass from our sustainably managed forestlands. In the U.S. we are managing more than 6 million acres. In the Pacific Northwest, our 7,000 employees are managing 2 million acres of timberlands, operating several lumber and paper manufacturing facilities and managing company businesses from our world headquarters in Federal Way, Washington.

The need for imaginative, sustainable solutions for the world’s challenges has never been greater. Weyerhaeuser and the forest products industry provide numerous forest products that people use every day, including lumber, pulp and paper. Forest biomass can also help augment fossil fuel products, including fuel, energy, plastics and chemicals.

The potential for the role of forests in biofuels is what brought Weyerhaeuser and Chevron together in February 2008 with the formation of our 50-50 joint venture Catchlight Energy. We are focused on the research, development and commercialization of technology for converting non-food, cellulose-based forest biomass into economical, low-carbon transportation fuels. As I will describe later, a key component of Catchlight Energy’s strategy will be large-scale, sustainable growing and harvesting forest-derived biomass from Weyerhaeuser’s forests in the U.S. southeast.

My comments will focus on the following points:

- The Catchlight Energy strategy, why the joint venture is important to both Weyerhaeuser and Chevron, and how we are approaching the technology challenges associated with conversion of biomass to liquid transportation fuels.
- The role of large-scale, sustainable forest biomass for biofuels and bioenergy production.
- How Catchlight Energy and Weyerhaeuser are working to understand the supply chain challenges for forest biomass.

- The factors necessary for successful commercialization of biofuels, bioenergy, and other bioproducts.

Last year Weyerhaeuser and Chevron formed Catchlight Energy LLC with a mission to develop and commercialize large scale production of forest-based transportation fuels. In doing so, we have brought together two companies with natural resource capabilities, conversion expertise and strong market access. Weyerhaeuser brings to the joint venture an understanding of growing, harvesting and transporting of forest biomass and manufacture of forest products. Chevron also brings production and refining expertise, along with the ability to move biofuels to the market. By bringing together Weyerhaeuser, Chevron and Catchlight Energy, we have covered all of the components of the “seed to sale” supply chain.

A key hurdle to success for Catchlight Energy – and any other cellulosic biofuels investor – is overcoming the technology challenges associated with conversion of biomass to liquid transportation fuels. Widespread research in this field has led to promising solutions involving biological and chemical pathways, though much work remains to successfully scale these solutions up for commercialization. Catchlight Energy expects to facilitate the demonstration and commercialization of some of these technology solutions, both through its own efforts and through partnership with others. Drawing on Chevron’s expertise in catalysis, we are exploring the conversion of biomass to hydrocarbons such as gasoline and diesel. While it may take a little longer to get there, we believe this technology solution is our best long-term opportunity. Renewable fuels in the form of gasoline and diesel will eliminate many of the challenges that ethanol presents when blended with gasoline.

Catchlight Energy’s success depends on a foundation of large-scale, sustainable biomass supply, delivered at an affordable cost. We realize, too, that there will be other demands for forest biomass – biomass for energy, biomass for building materials, biomass for pulp and paper, and biomass for future markets like biochemicals and bioplastics.

It is with this in mind that we are looking at an innovative way to increase forest-derived biomass supply on some of Weyerhaeuser’s four million acres of forests in the U.S. Southeast. In the South, many private forests are grown in rows on relatively flat ground – similar to what you might see in a fruit orchard here in the Northwest. We are exploring growing an energy crop – like switchgrass – between the rows of the high-value timber trees. We call this intercropping. We have begun the research to see what it will take to do this successfully – finding ways to maximize the energy crop production without compromising timber growth and ensuring that both the energy crop and the trees are grown in a sustainable manner.

Chevron and Weyerhaeuser want to ensure that we are able to grow, harvest and collect forest residuals, including the energy crops, in a way that provides minimal impact to water and air quality, watershed stream flow, soils, wildlife and carbon sequestration. In this area, we are studying how switchgrass and forest residuals are best prepared and collected for conversion. To understand these sustainability implications, we are partnering with third parties, including the U.S. Forest Service and several universities.

Beyond Catchlight Energy, Weyerhaeuser see tremendous potential for the forest biomass we have grown and forest products we have manufactured for more than 100 years.

Weyerhaeuser mills currently meet over two-thirds of their energy needs through the use of forest biomass, such as wood residuals and other organic byproducts. Our mills utilize high-efficiency combined heat and power facilities. We are constantly striving to increase our use of biomass and improve energy efficiency to displace fossil fuels and purchased electricity at our mills.

Today, utilities are also increasingly interested in utilizing forest biomass to help reduce their carbon emissions and meet renewable energy goals. Additionally, Weyerhaeuser and others are focused on research and development to find ways to use biomass to help supplement petroleum used in chemicals and plastics.

To understand how we can ensure a sustainable, ample supply of forest biomass feedstocks to meet all of these interests, over the past several months Weyerhaeuser has initiated several projects to understand our own biomass feedstock availability. These studies attempted to answer the following questions:

- What are the volumes and characteristics of the various feedstocks? These feedstocks include traditional forest residuals, understory and potential purpose-grown intercrops.
- What is the estimated cost structure, including collection, transportation, pretreatment and densification?
- What are the environmental impacts associated with the collection and removal process?

We have learned a lot through these projects, though we also have much more to learn. For our Pacific Northwest forests, here are the highlights of our learnings:

- The values of saw timber and traditional forest products will continue to be the primary drive for private forestland management. Forest residuals for bioenergy markets will be a secondary market opportunity, with the availability of forest residuals dependant on demand for saw timber.
- There is a reliable supply of raw materials available from private lands in Western Oregon and Western Washington. Much of this feedstock volume is in form of slash, limbs, chunks, and tops of trees that are traditionally left in the woods. This raw material volume will increase whenever housing starts return to traditional levels. Importantly, for renewable electricity the transmission grid capability is present in this same geography. While there is a base of infrastructure with existing mills to convert some of these forest residuals to bioenergy, additional conversion capacity will be needed to create a viable market for these forest residuals.
- Like intercropping, there are sustainability issues associated with biomass removal in our Northwest forests that need to be understood. These include effects on soil, impacts on wildlife and impacts on water quality and quantity. Initial work indicates that additional forest residuals can be removed without having an adverse impact on

the environment, including soil nutrients, and will not impact the ability of the ground to regenerate. In fact, it may aid in regeneration in creating more plant areas. To continue to understand the impacts of removal of forest residuals, Weyerhaeuser is utilizing a series of existing and on-going research efforts. Research examples include long-term site productivity network, soil disturbance classification system and soil operability risk rating. We also have several collaborative studies in the Pacific Northwest, including Panther Creek, Ore., where we're working with E.P.A., B.L.M. and Oregon State University.

- The residual forest biomass is a low value raw material and is sensitive to input costs. That is why this volume isn't recovered today. The main cost drivers for this material are the transportation and handling costs, so biomass value will determine the removal and delivery technologies. We will need a very efficient harvest and delivery system – one that minimizes handling and transportation cost.
- A variety of end products and conversion technologies will drive value back to the raw materials. Increased and steady demand will be the key to development this raw material resource. Wood pellet, bio-bricks, cogeneration plants, combined heat and power, wood-fired electricity plants, and wood-fired co-firing plants all present opportunities. However, each has different costs, logistical and regulatory operating structures. Given the high cost of transportation, this low-value feedstock may be best positioned to serve smaller, more numerous facilities that are located close to the forest source.

As we have evaluated biomass feedstock availability, we've also been engaged in understanding other ways that our forestland could be used for other renewable energy opportunities, particularly geothermal and wind.

In August 2008, Weyerhaeuser signed an exploration agreement with AltaRock, who is one of the leading companies focused on Engineered Geothermal Systems. Areas adjacent to the Cascade Mountains are an excellent location to test the technology. EGS presents a variety of positive environmental characteristics including small footprint, no carbon dioxide emissions and long-lasting, base load capacity.

The Pacific Northwest also has many areas that have potential for wind energy projects. Over the past few years, Weyerhaeuser has been in discussions with several wind power companies to determine the suitability of installing wind turbines in the forest setting. There are test sites collecting data to determine the interaction of wind and its properties within the working forest setting.

Whether it be for Weyerhaeuser's Oregon and Washington forests and mills, Catchlight Energy, or others interested in the potential of renewable energy and forest biomass feedstocks there are several factors necessary for successful pathways for commercialization of biofuels, renewable energy and other bioproducts.

- Technology breakthroughs are needed — not just for the conversion of biomass into biofuels, but also for harvest and transportation of energy crops and forest residuals, as well as conversion of biomass into other bioproducts like bioplastics and biochemicals. Government should continue to provide research, development and deployment support to biofuels.
- Successful business systems for any bioenergy product must be developed — from supplying feedstock, through conversion, to delivery to the consumer. This includes logistical systems for safely removing and transporting additional forest materials. An important variable is the value of the bioenergy itself. Bioenergy investments will require millions of dollars, and stability in energy policies and markets will be essential to support such investments. Wildly fluctuating values make it difficult to put significant investment at risk.
- Renewable energy policy should encourage the development of forest biomass for these new markets, while also preserving the existing biomass energy infrastructure at our mills. In order for Catchlight Energy, and Weyerhaeuser forests to be able to successfully participate in these new markets, a broad definition of renewable biomass is necessary. For example, the current definition in the renewable fuel standard does not cover biomass from energy crops grown in our forests. Another example would be the current draft of the Waxman-Markey bill which appears to exclude some of our mills' biomass energy, particularly bioenergy generated at our pulp mills, from the Renewable Electricity Standard.
- One of the most promising pathways for producing biomass-based biodiesel at scale is to co-process the biomass with a petroleum feedstock. Co-processing allows biomass-based oils and petroleum crudes to be processed together simultaneously in a single-processing unit at a refinery, helping to streamline the production and blending biomass-based diesel into transportation fuels.. Unfortunately, the RFS specifically prohibits co-processing of biomass-based diesel at refineries. This exclusion has the unintended consequence of stifling the development of an advanced biofuel production process. This prohibition should be removed.
- Finally, we need a rebounding economy. A rebounding economy will help return private investment into technology research, development and deployment.

Thank you very much for the opportunity to talk to you today. While there are several challenges, the opportunities for creating more value from our sustainably grown and managed forests, either here in the Pacific Northwest or elsewhere, are tremendous. Whether it is Catchlight Energy or Weyerhaeuser, we have an unbeatable combination of people and resources to be a part of the solution. We look forward to working with you to find ways we can release the potential in trees to solve important problems for the people and the planet.